

WHAT IS CLAIMED IS:

1. A method for promoting growth of a human central nervous system neuron damaged by a spinal injury and subject to growth inhibition by an endogenous neural cell growth repulsion factor, the method comprising the steps of locally administering to a human patient in need thereof at an axon of the neuron a therapeutically effective amount of an activator of a cyclic nucleotide dependent protein kinase, whereby growth of the axon is promoted; and detecting a resultant growth promotion of the axon.

2. The method of claim 1, wherein the activator comprises an active component selected from a cyclic nucleotide analog, an activator of a cyclic nucleotide cyclase, a nitric oxide (NO) inducer and an inhibitor of a cyclic nucleotide phosphodiesterase.

3. The method of claim 1, wherein the activator comprises an active component selected from:

(a) an activator of a cyclic nucleotide cyclase selected from an adenylate cyclase activator selected from forskolin, 7 β -deacetyl-7 β -[γ -(morpholino)butyryl]-forskolin and 6 β -[β -(piperidino)-propionyl]-forskolin; and a guanylate cyclase activator which is protoporphyrin-9 (PP-9);

(b) a cyclic nucleotide analog selected from a protein kinase-A (PKA) activator selected from 8-bromo-adenosine 3',5'-monophosphate (8-Br-cAMP), 8-chloro-adenosine 3',5'-monophosphate (8-Cl-cAMP), 8-(4-chlorophenylthio)-cAMP, dibutyryl-cAMP, dioctanoyl-cAMP, Sp-cAMPS and Sp-8-bromo-cAMPS; and a protein kinase G (PKG) activator selected from 8-br-cGMP, 8-(4-chlorophenylthio)-cGMP and dibutyryl-cGMP;

(c) a NO inducer which is an NO donor selected from S-nitroso-N-acetylpenicillamine (SNAP), Glyco-SNAP-1, Glyco-SNAP-2, 2,2'-(hydroxynitrosohydrazono)bis-ethanamine (NOC-18) and (+/-)-(E)-4-ethyl-2-[(E)-hydroxyimino]-5-nitro-3-hexenamide (NOR-3); and

(d) an inhibitor of a cyclic nucleotide phosphodiesterase selected from 3-isobutyl-1-methylxanthine (IBMX) and rolipram.

4. The method of claim 1, wherein the activator comprises an active component that is forskolin.

5. The method of claim 1, wherein the activator comprises an active component that is 7 β -deacetyl-7 β -[γ -(morpholino)butyryl]-forskolin.

6. The method of claim 1, wherein the activator comprises an active component that is 6 β -[β -(piperidino)- propionyl]-forskolin.

7. The method of claim 1, wherein the activator comprises an active component that is protoporphyrin-9 (PP-9).

8. The method of claim 1, wherein the activator comprises an active component that is 8-bromo-adenosine 3',5'-monophosphate (8-Br-cAMP).

9. The method of claim 1, wherein the activator comprises an active component that is 8-chloro-adenosine 3',5'-monophosphate (8-Cl-cAMP).

10. The method of claim 1, wherein the activator comprises an active component that is 8-(4-chlorophenylthio)-cAMP.

11. The method of claim 1, wherein the activator comprises an active component that is dibutyryl-cAMP.

12. The method of claim 1, wherein the activator comprises an active component that is dioctanoyl-cAMP.

13. The method of claim 1, wherein the activator comprises an active component that is Sp-cAMPS.

14. The method of claim 1, wherein the activator comprises an active component that is Sp-8-bromo-cAMPS.

15. The method of claim 1, wherein the activator comprises an active component that is 8-br-cGMP.

16. The method of claim 1, wherein the activator comprises an active component that is 8-(4-chlorophenylthio)-cGMP.

17. The method of claim 1, wherein the activator comprises an active component that is dibutryl-cGMP.

18. The method of claim 1, wherein the activator comprises an active component that is S-nitroso-N-acetylpenicillamine (SNAP).

19. The method of claim 1, wherein the activator comprises an active component that is Glyco-SNAP-1.

20. The method of claim 1, wherein the activator comprises an active component that is Glyco-SNAP-2.

21. The method of claim 1, wherein the activator comprises an active component that is 2,2'-(hydroxynitrosohydrazono)bis-ethanamine (NOC-18).

22. The method of claim 1, wherein the activator comprises an active component that is (+/-)-(E)-4-ethyl-2-[(E)-hydroxyimino]-5-nitro-3-hexenamide (NOR-3).

23. The method of claim 1, wherein the activator comprises an active component that is 3-isobutyl-1-methylxanthine (IBMX).

24. The method of claim 1, wherein the activator comprises an active component that is rolipram.

25. The method of claim 1, wherein the repulsion factor comprises an active component selected from a semaphorin, a netrin, a MAG and a CNS myelin fraction.

26. The method of claim 1, wherein the protein kinase is protein kinase A or G.

27. The method of claim 1, wherein the neuron is a corticospinal tract neuron.